BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

WHAT IS CLAIMED IS

1. A reforming method comprising two or more reforming rooms (6) connected in series, in which a gas mixture (2) comprising a fuel, water and air is supplied to one end thereof and a reformed gas (4) containing hydrogen is discharged from the other end thereof, wherein

a first catalyst (8a) that catalyzes a partial oxidation reaction in an oxygen environment is loaded into the upstream end of each of the reforming rooms, and a second catalyst (8b) for the reforming reaction is charged into the downstream portion thereof, and

the gas mixture is supplied directly to one end of each reforming room, and the reformed gas is discharged from the other end of the furthest downstream reforming room.

2. The reforming method specified in Claim 1, wherein the same catalyst that can catalyze both the partial oxidation and reforming reactions is used as the first and second catalysts (8a, 8b).

3. The reforming method specified in Claims 1 or 2, comprising a reforming tube (10) composed of two or more of the reforming rooms (6) connected in series, and a reformer housing (12) that encases the reforming tube, wherein

a high-temperature heating gas (16) is introduced into the space (14) formed between the reforming tubes and the reformer housing, and after the first catalyst (8a) and

the second catalyst (8b) have been heated up from outside the reforming room, the gas mixture (2) is supplied to each reforming room to undergo reforming.

4. The reforming method specified in Claims 1, 2 or 3, wherein the high-temperature heating gas (16) is supplied directly to one end of each of the reforming rooms (6) and is discharged from the other end of the furthest downstream reforming rooms, and after the first and second catalyst (8a, 8b) are heated up from inside the reforming rooms, the gas mixture (2) is supplied to each reforming room to undergo reforming.

5. A reforming apparatus comprising

a mixed gas feed tube (18) that supplies a gas mixture (2) composed of a fuel, water and air, and

a reforming tube (10) that converts the gas mixture into a reformed gas (4) containing hydrogen, wherein

the reforming tube comprises two or more reforming rooms (6) connected together in series, in which the gas mixture (2) is supplied to one end and the reformed gas (4) is discharged from the other end thereof,

each of the reforming rooms is filled with a first catalyst (8a) that catalyzes a partial oxidation reaction in an oxygen environment in the upstream portion thereof, and with a second catalyzer (8b) for reforming in the downstream portion, and

gas feed means (20) are provided on the mixed gas feed tube, that directly supply the gas mixture to each reforming room.

6. The reforming apparatus specified in Claim 5, wherein

the gas feed means (20) comprises an outer cylinder (24) that covers one end of the reforming tube (10) and at least a part of the side surface thereof, and forms a gap (22) around the reforming tube in the peripheral direction that works as a passage for the gas mixture,

inlet ports (26) are disposed on the side surface of the reforming tube and supply the gas mixture to each reforming room from the gap, and

the inlet ports comprise flow control mechanisms (28a, 28b) or flow regulate means (32a, 32b) for adjusting the flow of the gas mixture supplied to each reforming room.

7. The reforming apparatus specified in Claim 5, wherein the gas feed means (20) comprises a hollow penetration tube (34) for passing the gas mixture (2) through the interior of at least one of the reforming rooms, from one end thereof in the downstream direction of the reforming tube (10),

the penetration tube comprises inlet ports (36a, 36b) to supply the gas mixture individually to each reforming room, and

the inlet ports comprise flow control mechanisms (28a, 28b) or flow regulate means (32a, 32b) for adjusting the flow of the gas mixture introduced into each reforming room.

8. The reforming apparatus specified in Claims 5, 6 or 7, comprising a reformer housing (12) that encases the

reforming tube (10), and a first heating gas tube (28a) for introducing a high-temperature heating gas (16) into the space (14) formed between the reformer housing and the reforming tube, from the outside.

9. The reforming apparatus specified in Claims 5, 6, 7 or 8, wherein a second heating gas tube (38b) is connected to the mixed gas feed tube (18), to introduce a high-temperature heating gas (16) from the outside.

10. In the reforming apparatus that converts a gas mixture (102) comprising a fuel gas, steam and air, into hydrogen,

a reforming apparatus comprising a heating unit (104) for evaporating and heating the gas mixture, a distribution tube (108) that distributes the heated gas mixture evenly to a plurality of branch ports (106) disposed at one end thereof, a reforming unit (114) filled with a reforming catalyst (112) for catalyzing the gas mixture, a manifold (116) comprising the distribution tube on the inside thereof, a CO removal unit (124) filled with a CO removal catalyst (122) used to remove CO from the gas (118) reformed in the reforming unit, and a casing (126) for housing the reforming unit, the manifold and the CO removal unit, wherein

the reforming unit comprises a reforming room (132) composed of a reforming tube (130) of which one end is connected to the branch port and from the other end of which the reformed gas is discharged, or configured by disposing two or more of the reforming tubes parallel to

each other, and a feedback mechanism (134) for passing the reformed gas around the outer periphery of the reforming tubes and sending the gas to the manifold.

11. The reforming apparatus specified in Claim 10, wherein the CO removal unit (124) is located opposite or parallel to the reforming unit (114) and communicates with the manifold (16).

12. The reforming apparatus specified in Claims 10 or 11, wherein the feedback mechanism (134) sends the reformed gas (118) to the manifold through a reformed gas passage (136) formed by the space between the reforming tubes (130) located close to each other or between the reforming tubes and the casing (126), in the axial direction of the reforming tubes.

13. The reforming apparatus specified in Claims 10, 11 or 12, wherein the reforming tubes (13) can be freely removed and replaced.

14. The reforming apparatus specified in one of Claims 10 to 13, wherein a fuel trap unit (138) is disposed between the manifold (116) and the CO removal unit (124), to remove fuel gas from the reformed gas (118).

15. The reforming apparatus specified in one of Claims 10 to 14, wherein the manifold (116) comprises a feed tube (142) for feeding oxygen, air or steam to the reformed gas (118) sent to the CO removal unit (124).

16. The reforming apparatus specified in Claim 15, wherein the CO removal unit (124) comprises one section or two or more sections, and feed tubes (142a, 142b) are

disposed on the upstream side of each section to supply oxygen, air or steam.